

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



1.9  
76Le  
o.1

UNITED STATES DEPARTMENT OF AGRICULTURE  
Bureau of Agricultural Economics

LAND CLASSIFICATION FOR LAND USE PLANNING IN THE  
GREAT LAKES CUT-OVER REGION AS ILLUSTRATED BY  
FOREST COUNTY, WISCONSIN

By  
William F. Musbach, Collaborator

LAND ECONOMICS REPORTS - No. 1

Washington, D. C.  
1937

652935  
copy  
9/18-

The following titles were issued by the former Resettlement Administration in a series called Land Use Planning Publications:

- Number 1 Land Classification: Objectives and Requirements
- 2 Present Land Use Mapping: Methodology Used by High School Students, State of Washington, 1936
- 3 Supplementary Farming Homesteads in Recent German Land Settlement (reprinted from JOURNAL OF LAND AND PUBLIC UTILITY ECONOMICS)
- 4 Agricultural Landlord-Tenant Relations in England and Wales, and Scotland's Activity in Improving Farm Tenancy
- 5 Land Settlement Technique Abroad: III. Selection of Settlers in Agricultural Settlement of Several European Countries
- 6 The Utilization of Aerial Photographs in Mapping and Studying Land Features
- 7 Present Land Use in Morton County, North Dakota - A Comparison of Mapping Methods
- 8 Land Classification as a Basis for Land Appraisal and Equalization of Tax Assessments: Report on Land Classification Study in Nevada Township, Story County, Iowa
- 9 Problems of Land Tenure in Relation to Land Use Adjustment
- 10 Problems and Suggestions in the Drafting of Rural Zoning Enabling Legislation
- 11 Some Considerations in Support of the Constitutionality of Rural Zoning as a Police Power Measure
- 12 Isolated Settlement and Tax Delinquent Land in Northern Minnesota
- 13 A Summary of Existing Rural Land Use Legislation in Minnesota
- 14 Compensation as a Means of Improving the Farm Tenancy System
- 15 Recent Policies Designed to Promote Farm Ownership in Denmark
- 16 An Approach to Area Land Use Planning
- 17 Recent Trend Toward Diversified Farming in Southern Cotton Areas
- 18-a Public Finance Aspects of the Milk River Land Acquisition Project, Phillips County, Montana
- b General Framework of Law and Procedure within which Local Governments Operate in Montana

The present title, "Land Classification for Land Use Planning in the Great Lakes Cut-Over Region as Illustrated by Forest County, Wisconsin", is the first of a new series of Land Economics publications by the Bureau of Agricultural Economics, taking the place of the former Land Use Planning Publications.

LAND CLASSIFICATION FOR LAND USE PLANNING IN THE  
GREAT LAKES CUT-OVER REGION AS ILLUSTRATED BY  
FOREST COUNTY, WISCONSIN 1/

CONTENTS

531688

	<u>Page</u>
INTRODUCTION.....	1
SUGGESTED LAND USE CLASSIFICATION.....	5
Relation of Public to Improper Land Use.....	6
Suggested Classification.....	8
DEFINING STANDARDS FOR CLASSIFICATION.....	9
Minimum Standard of Living.....	9
School and Road Services.....	10
Farm Organization Necessary to Provide a Minimum Income.....	10
Settlement Pattern Necessary for Efficient Governmental Administration.....	12
TECHNIQUE OF SECURING DATA.....	12
Farm Records Useful.....	13
Tax Assessments a Source of Information.....	13
Non-Problem Areas Significant.....	13
Types of Problem Areas Distinguished.....	14
Non-agricultural Problem Areas.....	15
LAND USE CLASSIFICATION IN FOREST COUNTY, WISCONSIN.....	16
Classes Distinguished in Forest County.....	17
Method of Securing Data.....	19

INTRODUCTION

The broad objective of land use classification, as a phase of land use planning, is to aid in the development of a desirable program for public action affecting land use. Its function is to delineate land areas possessing uniform characteristics which have significant influence on the formulation of social policies. With the conscious recognition of government as a positive factor in the economic system, such policies assume a new importance and demand a thorough study of procedure and administration in their application.

Maladjustments in land use have been studied in many problem areas, such as the cut-over region here under consideration,

1/ C.P. Barnes, Land Use Planning Section of the Farm Security Administration, and Sidney Henderson, Land Use Planning Specialist for the State of Wisconsin, Farm Security Administration, gave helpful suggestions during the preparation of this report.

and appropriate policies have been designed for alleviating these problems. The purpose of land-use classification is to isolate homogeneous areas whose problems require a common policy, such as agricultural rehabilitation or settler relocation. Classification, as a phase of land-use planning, is a geographical concept in that it seeks to locate particular bodies of land adapted to various public programs. Such a grouping may be useful even though a difference of opinion exists as to the desirability of a specific policy for a given area. For example, a sparsely settled district on relatively good soil where clearing costs were relatively high might be classified either as "one from which settlers might justifiably be removed" or as "an area to which subsidized settlement of families from isolated or poor locations might best be directed."

If the basic characteristics of these areas are known, however, differing social policies will not invalidate the classification. It should be emphasized that this "optimum use" toward which these policies are directed is a dynamic concept that can be determined only in the light of both anticipated economic relations and the social philosophy of the planner. There is no single fixed yardstick by which all land can be measured and scientifically appraised for any of several uses.

#### Objectives Must be Defined

The essence of sound land-use classification consists first, in determining and clearly defining the objectives for which the classification is designed, and second, in ascertaining the data essential for meeting these purposes. Although to obtain complete information on all factors before proceeding upon a social policy is the generally accepted method in scientific circles, it is not necessarily an efficient use of limited research facilities. With uniform, detailed inventories, many types of classification can be developed. Often, however, a classification involving certain strategic or controlling factors in a given problem may be made from a reconnaissance type of survey, plus a more intensive study of these critical factors.

This method of obtaining particular information in order to decide the classification of such strategic factors might be called the procurement of "specific evidence", in contrast with the "inventory", which consists of the uniform assembly and organization of data for general, rather than specific, purposes, as in a detailed soils or vegetative cover survey. Certain types of detailed inventories are necessary in order to classify land for some purposes, while "specific evidence" readily obtained from restricted field observations of a reconnaissance type may suffice for other objectives. Where available, all inventories should be utilized as

a matter of course, but in planning a research program in an area without such information, the essential data necessary to formulate a policy should determine the amount and type of evidence to be secured. This plan is especially important in view of the fact that land-use programs are vitally necessary in large areas of the United States which do not have detailed inventories of their resources.

Since for many years to come the action program in the northern cut-over region will be directed at broad maladjustments in land utilization, the land classification phase of the program should be organized in harmony with this broad policy. As with the process of obtaining evidence, the number of classes established should be in keeping with the avowed objectives. In land-use planning for the Lake States, classification should be based primarily upon type of use rather than upon refined gradations in land quality. It is more important to separate areas suited to commercial farming from those in which this use does not appear feasible, than to distinguish the grades of productivity within a use class. The focusing of research upon those areas which are marginal as between major uses is likely to be most valuable for land-use planning in this region. Only classes whose characteristics materially affect land-use policies can justifiably be separated.

#### Preliminary Classification Important

As a practical approach, it is not desirable to attempt to solve all phases of the land problem at one time. Funds, personnel, and local politics and attitudes all restrict the rate of progress. Since the concepts of land-use planning are extremely dynamic, it is not expedient to acquire detailed and costly information relative to a region far in advance of the use for such material. Obtaining intensive data concerning the possibilities of reforestation before there is any likelihood of a planting program, is a case in point. By the time funds are available, changes in critical factors, as might result from forest fires, may have made the initial inventory and classification of little value.

Land-use classification is considered here as an evolutionary concept which develops along with a planning program. For example, a general classification based upon reconnaissance surveys 2/ might suffice for a rural zoning program. Later, when a

---

2/ A reconnaissance survey is a generalized examination designed to show broad characteristics of an area. Its form varies with local conditions and it may include soils, vegetative cover, and/or purely economic factors.

settler relocation or rehabilitation policy is projected, the earlier work may be expanded where necessary to bring out additional, essential information. Similarly, recreation and forestry programs may be planned as the demand arises, and in each case the initial classification may be further refined.

By concentrating on the critical factors in any given program, research facilities can be used most efficiently. The approach to the classification problem advocated here is, first, the preparation of a reconnaissance survey of the area, after which specific evidence, or specialized inventories, can be obtained concerning critical factors where and when they are necessary. In many cases, this reconnaissance survey itself can provide enough information for establishing a land policy which could not easily wait until a detailed classification were made.

One factor of particular importance is the aid which a preliminary classification would afford in determining where particular inventories, such as a detailed soils survey, are most necessary. In the northern cut-over counties of Wisconsin, it is possible to predict with considerable confidence the broad features of future land use on the basis of a reconnaissance soil survey, supplemented by a limited amount of field work and an analysis of probable future trends in agricultural prices. For example, rough, sandy, and stony blocks of land now covered with appreciable second growth timber or numerous pine stumps may be considered nonagricultural under anticipated price relations. Such areas, now rapidly reverting to public ownership, will find their highest use in various types of forestry and recreation. The data necessary to a program for improving the utilization of these areas differs from those required for an agricultural program on land adapted to the latter use.

Large areas of relatively good soil now covered with second growth or brush may also be delineated in this preliminary survey. If a program of agricultural expansion is adopted, these blocks of land must be examined by a detailed soils survey 3/ in order to determine more accurately the potentialities of the area, and to separate the various grades of land within the tracts.

---

3/ By "detailed" survey is meant one in which the survey party makes at least four traverses through each square mile. This enables the observer to inspect every 40-acre tract on the traverse, and usually permits separation of soil bodies of 10 acres or less. Where the amount of stone is a limiting factor, as in the recently glaciated region of the Lake States, more refined surveying than the above may be necessary.

The reconnaissance survey will indicate areas where more detailed information is needed to determine various types or intensities of land utilization. Intermediate, doubtful areas which are brought into clear relief by the preliminary work may, in some cases, constitute only a small part of the total area. Concentration of attention on these latter areas is far more efficient than spreading the effort uniformly over the whole region. It is not desirable to procure evidence far in excess of that required to formulate a land-use policy. 4/

#### A SUGGESTED LAND-USE CLASSIFICATION

A land classification procedure designed to meet the needs of land-use planning in the northern cut-over region is outlined in this discussion on the basis of a system developed for Forest County, Wisconsin. In this type of classification the use classes are separated on the basis of their particular problems and suggested adjustment policies, such as rural zoning; retirement of low-grade agricultural land; direction of settlement, whether by individual initiative or by public subsidy; agricultural rehabilitation; or intensive forest management.

Such policies, designed to aid in solving land problems in the region, cover both positive and negative aspects of land-use adjustment. On the one hand, their objective is to discontinue present uses which result in unjustifiably high social costs, and to prevent such future maladjustment, and on the other hand, to facilitate the development of socially desirable uses of land by both private and public owners. Settler relocation and rural zoning illustrate the first phase of planning, while agricultural rehabilitation and public forest management or subsidy of private timber owners are examples of the latter type.

Since the most critical problems in the cut-over area arise from present maladjustments in agricultural land utilization, a classification program here should first center around this form of use. Accordingly, all the land now partially or completely in agricultural use may conveniently be grouped into two broad classes, namely, "non-problem" and "problem" agricultural land, according to whether or not certain public policies are needed to

---

4/ In estimating the efficiency of an inventory, such as a detailed soil survey, it should be borne in mind that an appreciable part of the cost of such a survey is attributable to the necessary preparation of an accurate base map. Northern Wisconsin needs such maps for many purposes, other than to denote soil areas and, therefore, this part of the soil survey expense might properly be charged to other agencies and purposes.

influence land use. A third class would then be established to include land which is not being used for agriculture at present.

Criteria for evaluating agricultural land include two principal factors: (1) agricultural productivity of the land, and (2) pattern or distribution of settlement. The agricultural productivity determines in large degree the standard of living which can be maintained in an area, and the amount of relief and certain other social costs which may be required. Supplementary income, where obtainable, is also an important factor. The pattern or distribution of settlement affects the costs of providing such public services as schools and roads, the adequacy of market facilities, and the general social development of a community.

#### Relation of Public to Improper Land Use

There is some question as to the position which the government should take in regard to the use of poor land for agricultural purposes. It is believed here that those factors which directly affect the public interest should be considered first in judging the desirability of certain land uses and in determining a land program for the region. Low standards of living caused by settlement on poor land or by location far from markets constitute a serious problem to the families involved, and are of public concern even aside from their effect upon relief and other direct costs, but they become of greatest public concern when their plight becomes so extreme as to give rise to direct public costs. Likewise, isolated settlement of individual families or of very small communities may have serious personal and social consequences, but may justify public action first in those cases where public costs for schools, roads, fire protection, and law enforcement are increased by such isolation. The public is probably justified in dealing with cases not giving rise presently or prospectively to high public costs, only after the cases which do cause such costs have been treated. This is simply an application of the principle of bettering the worst things first.

In harmony with this social attitude, the chief criterion for measuring the social costs of using land of low productivity for agricultural purposes is that of public relief costs, and the main criteria for measuring the effects of isolated settlement are those of school and road costs.

In recent years, the provision of sufficient relief to maintain a certain minimum standard of living, has been generally accepted as a public responsibility. Other social costs resulting from low family incomes are less tangible, and have not been as generally recognized as a matter of public concern; neither have

there been any standards established by which to judge these less tangible results. Even relief costs have not as yet received any material recognition in the formulation of public land policies in the cut-over region. The two main policies, rural zoning and settler relocation, have been predicated in a large degree upon high per capita costs for schools and roads, rather than upon the maladjustments arising from the farming of poor land.

In order to avoid the difficult problem of ascertaining the suitability of an area for settlement by means of records of relief expenditures, which vary according to differences in relief policy, a plan is suggested for estimating relief costs likely to result from the agricultural use of certain areas, if all governmental jurisdictions followed a uniform policy of extending relief. Assuming a minimum standard of living is to be maintained by public agencies, the probable relief costs can be obtained by determining the difference between the estimated productivity of the land and the assumed standard. The per capita costs for schools and roads, being somewhat more easily determined and more generally accepted, do not present such great difficulties in their use as criteria for land-use classification.

As a part of an action program, classification should break down the "problem" agricultural land into areas with distinctive problems requiring particular social policies. In the cut-over areas, for example, two important problems are isolation of settlement and uneconomic farm units for which settler relocation and agricultural rehabilitation respectively, are likely policies. The maladjustments in agricultural use are responsible for the most urgent problems in land use planning in the cut-over area, but a complete program here should also include policies to facilitate nonagricultural uses. Classification should group undesirable agricultural areas on the basis of their adaptation to varying intensities or forms of either forest management or recreational development.

In practice, a research program is often limited by insufficient data for a complete classification of agricultural and other uses at one time. In such cases the two main types of "problem" and "non-problem" agricultural land should be distinguished in as detailed a manner as possible, after which the "problem" land can be subdivided on the basis of its adaptation to various policies, such as settler relocation or agricultural rehabilitation. If additional data are available, the nonagricultural land can be classified as forestry and recreational land; and finally, even these classes may be further divided into varying types of use, such as intensive and extensive forest area. Often it is possible to make the first broad classification with existing data, and to refine the work as more information becomes available.

### Suggested Classification

A suggested outline for this evolutionary classification procedure based upon existing use in the cut-over region is as follows:

#### Class I. "Non-Problem" Agricultural Areas

- A. Agricultural areas not characterized by low farm incomes or unduly high public costs, whose continuation in agriculture may be encouraged through the extension of public services, such as roads, power and electric lines, schools and credit
  - 1. Commercial farming areas
  - 2. Part-time farming areas

#### Class II. "Problem" Agricultural Areas

- A. Agricultural areas with low farm incomes, high public costs, or both, where alternative policies include agricultural rehabilitation, by one means or another, providing supplementary income, or acceptance of permanent relief as a necessary social cost
- B. Agricultural settlements with low farm incomes, high public costs, or both, where the choice of policy lies between settler relocation or acceptance of public relief as a necessary social cost
  - 1. Adapted to intensive recreational use
  - 2. Adapted to forestry
    - a. Intensive forestry
    - b. Extensive forestry

#### Class III. Areas not now used for agricultural purposes

- A. Areas well adapted to agriculture, to which new settlement might be directed
- B. Areas not well suited to agriculture
  - 1. Adapted to intensive recreation

2. Adapted to forestry

a. Intensive forestry

b. Extensive forestry

It is believed that this three-fold division of land is of primary significance for land use planning in the cut-over regions. The subdivision of the three classes need not be made immediately following the differentiation of the three main classes, and may be modified according to the imminence of public programs or to limitations on research facilities. The basic procedure, however, of dividing the region into three broad classes of areas, namely, those where existing agriculture appears socially desirable, those where existing agriculture is of a "problem" character, and those where land is not in agricultural use -- together with a division of the last two classes according to particular land-use problems and appropriate policies -- gives promise of general applicability in the region.

In this particular classification it is considered desirable to designate alternative uses, such as forestry or recreation, for areas where agriculture offers little or no opportunities. Since a land-use program in this region should include nonagricultural policies, land classification must contribute to this field as well as to an agricultural program. If necessary, the non-farm classification may be made after the basic division of land according to agricultural problems and policies has been completed. One advantage of this evolutionary type of land classification is that the work may be extended over a period of years as the problems become acute and as research facilities are made available.

DEFINING STANDARDS FOR CLASSIFICATION

Before land use classes can be established, certain standards must be defined. Concepts of desirable and undesirable land use can only be interpreted in terms of definite and concrete criteria.

Minimum Standards of Living

A standard of living concept is essential if potential relief costs are to be directly related to land utilization, since expenditures for relief are directly dependent upon the living standards around which society bases its relief policy. This level may range from zero, where there is no policy, to one of a thousand

dollars or more of goods and services per year. If the former, the relief factor obviously ceases to be a determinant in land utilization. If the latter, relief costs affect much land use in this country.

Some arbitrary level must be set in order to distinguish agricultural areas socially undesirable on the basis of their costs. If this minimum is to be a real income of \$500 a year, for example, all areas unable to produce this amount may be considered "high cost" and hence, undesirable. The height of the cost is then dependent upon the difference between this minimum and the amount produced by the farm.

A land area may change in its relation to relief costs with changes in social philosophy. In some measure, increased expenditures for relief in the last 4 years are due to a changed social attitude of government, independent of decreased economic opportunities.

#### School and Road Services

School and road costs must be analyzed in the same way on the basis of some standard of service. If schools are 1-room, poorly staffed and equipped institutions, with a 4-month term, costs will be low, even in a sparsely settled area. If they are large, well-built structures, competently staffed and well-equipped, with an 8-month term, costs will be relatively high, even in a compact settlement.

#### Farm Organization Necessary to Provide a Minimum Income

After the standards for social costs have been established and the minimum income necessary for meeting them have been determined, a farm-management plan for the region should be set up in order to find the approximate amount of capital and labor required to produce the minimum income under conditions of "average" management. The approximate amount of cleared land, number and type of livestock, and number and size of buildings, can be estimated for this region. If different types of farming are found worthy of consideration, several estimates may be necessary.

The general dairy farm and the dairy farm with a specialty crop, such as potatoes, are the chief types to be distinguished in northern Wisconsin. Table 1 illustrates the type of data suggested for use in establishing such standards.

In deciding minimum levels of income and the farm organization necessary for providing it, assumptions as to future

agricultural prices or purchasing power must be made. With higher prices, some areas ruled out of Class I, non-problem land, on the basis of their relief costs might reach or exceed the minimum earned farm income. Conversely, whether or not land belongs in Class I, depends upon the continuation of at least existing prices for farm products.

To a somewhat lesser degree, the classification is dependent upon the course of industrial prices in determining net farm purchasing power. Definition of these variable factors is necessary if the classification is to be of value in a broad, long-time social program.

Table 1 is based upon information obtained in the years 1932 to 1934 from farm records collected by the office of Farm and Dairy Records, Wisconsin College of Agriculture.

Table 1. Cash Income and Cash Farm Expenses with Various Numbers of Crop Acres in Northern Wisconsin

Dairy and General Farms

1932-1934						
Size in Crop Acres	:	Income	:	Expenses a/	:	Balance
10	:	\$ 290	:	\$ 220	:	\$ 70
15	:	460	:	250	:	210
25	:	800	:	300	:	500
35	:	1120	:	385	:	735
45	:	1450	:	550	:	900
55	:	1700	:	770	:	930
65	:	1940	:	850	:	1090
75	:	2080	:	910	:	1170
85	:	2220	:	990	:	1230
95	:	2300	:	1045	:	1255

a/ Interest and depreciation not included.

These scales of values are based upon the following averages:

Price of butterfat per pound -----	\$0.30
Production of butterfat per cow -----	175
Feed raised per crop acre -----	\$16

It is also important here to study the comparative advantage of the region for agricultural production in estimating future

income-producing ability. If competing regions threaten to replace markets in the future, this factor must be considered in applying policies encouraging or restricting farm settlement. Shifts in national production -- as by tobacco farmers to potatoes, or corn-hog farmers to dairying -- are important, as is the influence of such Federal policies as the Soil Conservation Act.

#### Settlement Pattern Necessary for Efficient Government Administration

After standards of service of governmental functions have been established, the minimum size and density of settlement necessary for keeping per-capita costs at a reasonable level must be determined. The cost of schools and roads is difficult to secure on a regional basis, but it is readily apparent that these vary with the size and density of settlement. Standards for determining these costs may be fairly broad and still be of value here. Density of population on the basis of farms per mile of road or pupils per school teacher is suggested among other criteria.

It is assumed that these governmental costs are socially necessary and are not an extravagant or grossly inefficient use of public funds. In some cases, it may be necessary to qualify the classification by assuming either a practical form of local government in which costs might be reduced, or by assuming the existing organization with its unreasonably high costs. A compact settlement of productive commercial farms in a town where governmental expenditures are excessive because of inefficient administration is an example of this problem.

#### TECHNIQUE OF SECURING DATA

Having made certain tentative minimum estimates of the amount of land and buildings and of community pattern necessary for desirable agricultural utilization, the investigator may proceed to outline areas where these standards are met or are exceeded under existing farm use. By driving over all available roads in the area, observations as to quality of farms can rapidly be made. Often a rather hasty examination will suffice for the best farm land in the area.

As the marginal cases of the class are approached, however, more detailed investigation is required. Here inspection of farms on foot must be made if there is any question as to classification. A map of land in farms, which in Wisconsin can be made from assessor's records, should be prepared before field work is begun.

### Farm Records Useful

Where available, farm records properly interpreted may be of value in this type of classification. It is believed, however, that only in very exceptional cases will it be necessary to obtain detailed farm-management data in order to locate land adapted to continued agriculture. For the most part, it is probable that inferences obtained from the appearance of the farm enterprise as a whole will suffice for this type of land-use classification. In addition to records of rural rehabilitation, drought relief and direct relief applications provide valuable data, and are usually available in the cut-over area.

### Tax Assessments a Source of Information

In some cases, tax assessments may be of aid in selecting Class I land. An attempt should be made to ascertain the assessed valuation of the operating unit usually associated with the minimum family income. Such assessments might then be used as a check on estimates made by other methods. A map of all farms exceeding this minimum assessment is suggested as a guide in the classification. In Wisconsin, the ratio of assessed to true valuation often varies as between towns, and a judiciously chosen correction factor may be necessary to place assessments on a comparable basis throughout a county.

### Non-Problem Areas Significant

This discussion has been confined mainly to distinguishing the commercial type of farming areas. The non-problem part-time farming class is of minor significance in the cut-over areas. In sections of northern Wisconsin, part-time farming areas of this type are found adjacent to small cities and villages, and as now used for agricultural purposes, this land does not present any serious social problems. It represents rural land from which the farm income is supplemented by some outside employment.

In isolating this sub-class, it is necessary to consider non-farm criteria, such as factory employment and payrolls, and relief expenditures, in addition to the general appearance of the farm unit. As a practical problem, it is difficult to separate commercial from part-time farms in this area, since outside income is obtained on many farms where \$1,000 or more gross income is obtained from the farm. The main objective in separating these subclasses is to distinguish areas directly dependent upon non-farm income for their continuation. The margin where a farm receives just enough income from agriculture to be considered commercial is not as critical for land-use planning as the margin

between non-problem and problem land, or between subclasses of the latter type.

#### Types of Problem Areas Distinguished

After isolating the agricultural land not now giving rise to social problems, attention should be directed to farming areas now "problem" in character, which might be raised to Class I by the application of certain policies, singly or in combination. Detailed soils and vegetative cover surveys are particularly useful in accurately separating this class. A large part of northern Wisconsin suffers from the effects of insufficient cleared land, and to a lesser degree, from inadequate capital. When the soil is productive and clearing costs are moderate, a long time social program might be directed at building up these areas through agricultural rehabilitation. If the settlement pattern is sparse, but soil conditions, market facilities, and clearing costs are favorable, it may be desirable to subsidize new settlement rather than to relocate existing families. Where farms are of inadequate size to provide minimum standards of living, it may be expedient to encourage the blocking up of several holdings.

Lastly, there are distress areas in the cut-over region where the cessation of industrial activity has left part-time farms without their main source of income. Faced with the apparent dilemma either of moving families or of accepting permanent relief, it is believed reasonable to suggest maintaining the present population in place through providing some source of supplementary income. Where such opportunities appear probable at present or in the near future, this subclass should be distinguished. With the management of large parts of the cut-over region by the Forest Service and the private forestry programs of some pulp producers, this policy is likely to take on additional significance.

Having grouped all areas whose maladjustments may be corrected by improving their agricultural utilization, the observer may next isolate Class II-B, where these maladjustments cannot be remedied under the existing type of land utilization. In this class, relocation or permanent relief are the main courses of action left to society. The complexity of a relocation program makes it difficult to classify these areas any more accurately than to indicate that within this class are families who need resettlement more than any others in the region.

It is suggested that a priority of purchase be attached to each farm in order to be of maximum benefit to local governmental

units as well as to the individuals concerned. 5/ Sub-units might then be created to indicate areas where the problem of relocation has varying degrees of urgency.

The third main classification of land suggested for this region consists of areas not now used for agricultural purposes. It is very desirable to divide this class into areas well adapted to agriculture, and into areas not so adapted. To make this separation accurately, a detailed soil survey is always required; and a vegetative cover survey is often necessary. It is possible to make some generalizations as to the value of unused land, however, from a reconnaissance soil survey supplemented by limited field observations. In many cases this class can thus be materially delimited by blocking off areas obviously ill adapted to agriculture from those whose potentialities are in doubt.

Where a policy of agricultural expansion is desirable, it is extremely important that detailed soils information of all cut-over land be obtained. No compromise should be made in securing complete data as to the physical resources of any areas where settlement is to be encouraged. This does not imply that such inventories are of primary importance where physical or economic relations, or both, are unfavorable from a reconnaissance survey. (See introduction to this report.)

#### Non-Agricultural Problem Areas

The non-agricultural classification of Class II-B and Class III may be projected along with the agricultural grouping, or at a later date. For the most part, areas suited to intensive forms of recreation, such as lake or river resorts, may be isolated with little difficulty. These areas are significant because of the need for protection against conflicting uses as recognized in the recreational type of rural zoning, and because of their effect on the tax base.

In terms of area involved, forestry promises to be the most important form of land utilization in the region, and for this reason, social planning should emphasize efficiency in forestry use as well as in agriculture. Land-use classification can aid in forestry utilization through isolating areas suited to various types of management and ownership. For example, the problem of supplying spruce pulp for the large paper industry in Wisconsin would be aided by separating areas in the cut-over region which

5/ See, Wehrwein, G. S. and Baker, J. A. "Relocation of Non-Conforming Land Users of the Zoned Counties in Wisconsin", in JOURNAL OF LAND AND PUBLIC UTILITY ECONOMICS, August 1936, p. 255.

offer opportunities for reforestation from land where commercial planting is not feasible.

The accurate classification of land for forestry use requires detailed information as to the soils and vegetative cover of the region. Again, it is often possible to block out large areas where a reconnaissance survey may furnish the basis for land-use planning. For example, tracts of mature timber may be located from assessment records. With the more general appreciation of the land problems in the cut-over region, it is probable that more extensive surveys and more accurate classifications will be made possible.

#### LAND-USE CLASSIFICATION IN FOREST COUNTY, WISCONSIN

To illustrate the practical application of the land-use classification procedure suggested here, a brief summary is presented of a classification project carried out in 1936 in Forest County, Wisconsin. This county is one of the poorest in the State as measured by such indexes as assessed valuation per farm, value of farm products, or income tax receipts. It represents in somewhat exaggerated form the condition of many counties in the cut-over region of the Lake States. The trend toward public ownership of forest land is especially marked. Public costs for schools, roads, and relief are very high because of isolated settlement and the cultivation of land unsuited to agriculture.

Because of the threatened breakdown of local governmental machinery and finances in Forest County, considerable attention in this survey was directed toward the adjustment of local government to the changing land use in the area. Many governmental problems can be solved only through altering undesirable types of land utilization, and, conversely, the organization of government and its functions must be adapted to the improved forms of land use resulting from a land program. The classification set-up for Forest County was designed as an aid both to a better utilization of land and to a better adjustment of governmental forms and services to such utilization.

The grouping of use areas on the basis of common characteristics permits both the estimate of future demands for governmental services, and the capacity of these areas to pay for them. For example, it would not be expedient to continue an elaborate system of local government in a decadent area, whether or not the decline in population is hastened by social action. Similarly, compact agricultural settlements require numerous services which can

only be provided by an intensive form of government. The difference in tax-paying ability of these two classes of land is readily apparent. The effect on the tax base of merchantable timber likely to be cut in the near future is obviously different from that of relatively stable agricultural land. The relation of unused cut-over land to the tax-base is also apparent.

Another important factor in suggesting efficient types of local government is the geographic relation of the various use classes. Frequently, town boundaries were established at an early period when present land uses were not anticipated. For example, in some cases, small farming communities have developed along the boundaries of two towns. Here the tax base of either town is inadequate to maintain necessary governmental services which might be more easily provided if the entire area were included in one town. Similarly, there is no justification for dividing the administration of large, sparsely settled, cut-over areas among numerous towns.

In addition to aiding in the development of a sound program for local government in the area, land classification should expedite the application of land policies such as agricultural rehabilitation and settler relocation. Limited research facilities prevented the formulation of a classification system sufficiently complete to provide an entirely satisfactory basis for these policies. But some generalizations are possible. For example, it is probable that a relocation program should first be directed to sparsely settled areas of "problem" agricultural land. In the densely settled "problem" agricultural areas, the question of public policy will probably turn on the adaptability of the farms to rehabilitation or relief, or the possibility of providing supplementary income, with settler relocation a doubtful alternative.

After taking a preliminary view of the county's physical resources and of the physical and social problems involved, it was found feasible to carry the classification scheme, suggested in the first part of this paper, to the point of delineating Classes I, II and III, and Subclasses II-A, and II-B. Time and financial resources did not permit carrying out further subclassification.

#### Classes Distinguished in Forest County

Class I in Forest County includes agricultural land which is now used predominantly for commercial farming and which is capable of providing a net cash farm income of approximately \$400 or more on an 80-acre unit with 1936 prices. In addition, the density and size of settlement is adequate for the distribution of public

services at a cost commensurate with that in commercial agricultural areas in the remainder of the State.

Class II, Problem Agricultural Areas, includes land inferior to the first group by one or both of the following criteria: (1) suitability for commercial farming, and (2) density of settlement. A much smaller portion of this class is used for agricultural purposes and fewer farms are of the commercial type than in Class I.

Class II-A is obviously the critical group since lack of information prevents the formulation on a rational basis of a definite policy either toward expansion or contraction of agriculture in the area. Certain policies are eliminated as being undesirable, however, as in Classes I and II-B. It is frankly recognized in this classification that densely populated settlements of any size receiving inadequate incomes because of poor soil, insufficient cleared land, or both, require more refined economic analysis than was possible here. It is believed of value, however, to separate these doubtful areas in order than land-use planning can be concentrated where the needs for it are most urgent.

Class II-B includes relatively sparse agricultural settlements with inadequate farm incomes, high public costs, or both, where a settler removal policy should be directed first. Governmental agencies are now hastening the natural evacuation of these areas. Occasional settlers along roads may not require relocation and some may not need relief supplies.

Class III, although virtually all forest or cut-over land, includes some slight agricultural development in Forest County which can be considered "problem" for the most part. Except where such development borders on Classes I or II-A, settler removal may be regarded as a general policy for the class. The difference between this class and Class II-B is one of degree - there are relatively few settlers in Class III. It should not be inferred, however, that settler removal is any less urgent for these few farmers than for those in Class II-B. Rural zoning is recommended, with little qualification, for both Classes II-B and III, and for sections of Class II-A where unfavorable physical conditions are obvious from a reconnaissance survey.

In selecting the three classes of land for study in Forest County, it was necessary to reject other important groupings which either required more detailed investigation than was possible or which presented problems less pressing than the ones above. For example, certain sections of the "non-problem" agricultural land require changes in farm management or tenure for optimum utilization and these also might well have been separated.

It was apparent in studying land problems in Forest County, that the approach to the classification problem through detailed inventories was impossible because of insufficient data. The sole physical inventory is a reconnaissance soil survey made in 1915 (Reconnaissance Soil Survey of Northeastern Wisconsin). Although this study is perhaps as good as any of its type, several inherent limitations restrict its usefulness. Some of the most important of its shortcomings are: (1) insufficient information as to topography and stone, (2) lack of accuracy as to soil boundaries in areas inaccessible at the time of survey, and (3) lack of detail in separation of soil types.

Forest County does not have an accurate base map. Data on vegetative cover were made available for a limited portion of the area after the preliminary classification was completed. Information as to farm management in the county was provided through the Rural Rehabilitation Division of the Farm Security Administration (formerly Resettlement Administration). A total of 150 drought-relief cases supplied general estimates as to crop acreage and annual production, while 35 farm plans gave a detailed picture of agricultural operations within the county. In addition, 171 schedules of farms proposed for purchase by the Farm Security Administration were made available during the progress of the classification. With these limitations as to source of material, it was necessary to devise a technique for acquiring sufficient data upon which to base a land-use planning program.

#### Method of Securing Data

To secure information as to the physical and economic resources of the area adequate for the classification, it was necessary to use the "car-window" method of survey for the most part. The entire county was examined from the roads, and this survey was supplemented by trips on foot wherever conditions called for more detail. Particular attention was paid to the region now in farms, together with adjoining unoccupied areas close to social utilities.

Notes regarding type and condition of farms, soils, topography and stone, market facilities, concentration and size of settlement, were made and the land-use areas blocked out in a general way. After consulting with all local officials about these areas, an attempt was made to refine the location and characteristics of each. Subjective information was obtained by interviewing a large number of farmers and other local inhabitants. Representative soil profiles were examined in every area and an attempt made to correlate soils series here with those already established in other northern counties. The 640-acre section was

the unit of classification, and, in general, this is the limit of accuracy, although smaller areas were distinguished where possible.

One area from each class will next be described in order to illustrate the type of data upon which the classification was based.

Class I, Area I, "Non-Problem" Agricultural Area. "Agricultural areas whose continuation in agriculture may be encouraged through the extension of public services, such as roads, power and electric lines, schools, and credit."

Area I of Class I comprising 23 square miles, includes the largest and most productive body of agricultural land in the county and lies in township 37 and range 12 and 13. This is one of the oldest settlements in the county and the stage of agricultural development is correspondingly advanced. Farms are usually 80 or 120 acres in size, with the average, 104 acres, materially higher than the county-wide figure of 81. The average value of land and buildings per farm as recommended by the State Tax Commission is \$3300, or \$32 an acre, in contrast with the county average figures of \$1,390, or \$17, respectively. There are 76 farms in the area.

Settlement is well concentrated along the roads, especially in the eastern part of the area. No great opportunity for internal expansion is possible, although there is some potential agricultural land in the western sections. Only 58 percent of the area is in farms but a rather large proportion of the remainder is composed of swamp and other non-clearable land. The desirability of continuing or increasing a forestry program in the western part of the area by the Forest Service should be weighed against the need for more agricultural settlement to improve the strength of the existing community.

A general type of agriculture built around dairying is characteristic of this area. Potatoes have been an important crop, but unfavorable weather conditions along with poor prices have reduced the attractiveness of the crop somewhat in recent years. Corn does not always mature early enough to make good silage, but earlier maturing strains might remove this difficulty. Chopped roots, rutabagas, and mangels are recommended as a substitute for silage. Adequate quantities of hay, oats, and barley for local consumption are nearly always produced. The agricultural depression has brought about unsound management practices on many farms, such as undesirable rotations and insufficient use of mineral fertilizers. The permanent establishment of this and other Class I areas on a "sustained yield" basis is of the utmost importance for

the future welfare of the county.

The soils of the area are largely of a type similar to the Antigo and Kennan silt loams as mapped in Langlade County, lying immediately to the south. The rolling morainic soils derived from granitic glacial till material are identified as of the Kennan series, while the level or gently rolling out-wash plains, composed of alluvial deposits left as the glacier retreated, are mapped as the Antigo series. The entire county was originally heavily wooded and these two soils have about the same quantity of organic matter. The chemical composition is likewise similar, since the material of the Antigo series is similar to that of the Kennan, the former having been merely washed down and redeposited. Both are considered productive soils for this region. Stratified sand and gravel occurring at depths of from 18 inches to 30 inches make the Antigo soils somewhat better drained than the Kennan. Where the sand and gravel occurs at less than 24 inches, the soil is likely to be somewhat droughty.

The texture of the surface soils in this area is variable, ranging from fine sandy loam to heavy silt loam. A rather large proportion of the area is cut by raw peat swamps which are of little value for pasture, and make it difficult to block out fields for farm operation.

Topography is undulating to gently rolling for the most part, with some broken land as an exception. The area is predominantly gently rolling in character, of about 3 to 5 percent grade, and slopes are rather short, as a rule.

Erosion is negligible. The distribution of stone is very irregular through the area, ranging from an almost stoneless condition to one where over 50 loads per acre are found. Such extremes may be found within 20 rods or less. The stone is generally of cobble size or slightly larger and hence is easy to clear when found in moderate quantity. The stony areas may often be used productively for pasture in connection with crop land.

Transportation needs are amply met by a good system of town, county, and State roads, together with railroad connections on the Minneapolis, St. Paul, and Sault Ste. Marie Line at the village of Argonne, and the Chicago and Northwestern at Crandon, 7 miles south. High schools and grade schools are located in the villages of Hiles and Argonne. A creamery and a potato warehouse are found in Argonne, and Crandon furnishes a supplementary market.

Class II-A, Area 3, "Problem" Agricultural Land. "Agricultural areas with low farm incomes, high public costs, or both,

whose alternative policies include agricultural rehabilitation, acceptance of permanent relief as a necessary social cost, or providing supplementary income."

This area of Class II-A is a large tract occupying nearly all of the township of Crandon, five sections in the northwestern corner of T.36, R.13 and the western portion of T.35, R.12. In all, some 54 square miles are included. In this unit, 110 farms are located with the lowest average value of land and buildings per farm of any area in the county, \$710. The average size of farm is 67 acres -- also the smallest of any area in the county.

Although State Highway 8 and County Trunk Highway B pass through the area, town roads constitute the most important part of the road system. Railroad connections are at Crandon and Nashville. School and market facilities are adequate. The soils of the region vary from Plainfield sand to a heavy Kennan silt loam with the latter predominating. Topography is undulating to gently rolling on the former type, and rolling to steeply rolling on the latter. Long ridges extending northeast and southwest cut up the region, especially in T.35, R.12. Rock is widely distributed on the Kennan soils and, along with the rough topography, constitutes the chief hindrance to a commercial type of agriculture.

Settlement is generally isolated throughout the area except for several "clusters" of farms, along State Highway 8 and along some town roads. Swamps, rough land, and stone inhibit concentration of farms. Because of these three factors, it is impossible in many cases to establish a farm unit of requisite size to provide a decent standard of living without outside income.

The majority of farms are of the subsistence type, and obviously cannot provide a comfortable living standard of even a rudimentary sort without outside income. Settlement is too dense for a complete abandonment of the area to appear practicable. Whether the people could improve their position by a change to a more desirable agricultural area is questioned at this time since a large proportion of the settlers lack qualifications for successful operators of commercial farms. The Federal Forest Purchase Program does not include any of the area, and this incentive for selling out is therefore lacking. Farm abandonment has been prevalent but recent population shifts into the region have stabilized the area to some extent. The low standards of living of the "Kentuckians" in the area will no doubt enable them to persist in spite of undesirable conditions.

Class II-B, Area 1, "Problem" Agricultural Area. "Agricultural settlements where the choice of policy lies between settler

removal and the acceptance of permanent relief as a necessary social cost."

Area 1, Class II-B is located in T.40, R.14 of the town of Alvin. Sixteen square miles make up the area, although several sections are included only to block out the tract. Twenty farms, with an average value of \$940, are located in the unit. School and road utilities are fair to good, but marketing facilities are very poor; Iron River, Michigan, the closest center of population, is 20 miles or more from the area.

Soils range from Vilas sandy loam to Kennan silt loam, with the heavier soils predominant. Stone is widely distributed throughout the area in amounts ranging up to 70 loads per acre. Poorly drained soils are extensive. The majority of the land not now in farms is held by public authority. Settlement is sparse and isolated, and living standards are low with but few exceptions. There are only three or four commercial farms in the area; the remainder are subsistence or part-time in character.

The Forest Service and the Farm Security Administration (formerly Resettlement Administration) purchase programs are accelerating the natural depopulation of the area, and it is expected that few if any settlers will continue to reside there more than a few years longer.

Class III, Land Not Used for Agriculture at the Present. Class III was not divided into areas since all its basic characteristics are relatively uniform throughout, as far as this type of classification can ascertain. One assumption made in developing the classification procedure here was that additional agricultural utilization in this region was neither probable nor socially desirable. If an expansion program for farming was deemed advisable, a determination of the potential agricultural value of some of this unused land would be necessary. At present the settlement is so sparse and the areas suitable for farming under present conditions are so small and scattered that the area, as a whole, is classified as non-agricultural. Much of the area is already included within a Federal Forest purchase area. A program of retiring what little agriculture there is might well be applied to most of the area. Forestry and recreation should be the major uses for the land.

The following tables are presented as illustrations of certain types of data which were used, partly in developing the classification here presented, and partly as a check on the classification after completion. Reference may be made to the accompanying map for the location of the land-use classes shown in the tables and of the individual units of those classes, as already discussed in the text.

Table 2. Relative Size of Land Use Classes,  
Forest County, Wisconsin

Class	Percent of Total Area	
		Percent
Class I	:	7.3
II-A	:	11.7
II-B	:	8.6
III	:	<u>72.4</u>
Total	:	100.0

Table 3. Density of Settlement  
Forest County, Wisconsin, 1936

Class	Rural population per square mile	Farms per square mile
Class I	17	3.2
II-A	14.8	2.4
II-B	7.2	1.3
III	.9	.13
All areas	4.3	.72

Table 4. Agricultural Land Use by Land Use Classes  
Forest County, Wisconsin, 1935

Class	area	farms	in farms	farms	Average size of farms	land and buildings	Average value of land and buildings per farm a/
	: Acres	: Acres		: Acres		: \$	
I	47,723	20,796	44	241	86		1968
II-A	75,796	20,798	27	286	73		1074
II-B	55,598	9,437	17	112	84		1148
III	470,254	8,347	2	96	87		1164
All areas	649,281	59,378	9	735	81		1390

a/ True value, as recommended by the State Tax Commission.



